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OPEN FILE REPORT

ARGILLACEOUS LIMESTONE AND RELATED ROCKS (Upper Precambrian) Buff-to orange-weathering, thin bedded, argillaceous limestone and dolomitic limestone in the western Seward Peninsula and micaceous calc-schist elsewhere. Quartz veinlets common. A thick apparently unfossiliferous sequence present over large parts of Seward Peninsula and considered to depositionally underlie lower Ordovician limestone and overlie carbonaceous sedimentary rocks in the York Mountains. May be in part of Cambrian age. (Sainsbury, 1969) SILICEOUS METASEDIMENTARY ROCKS (Upper Precambrian) Medium to dark-gray, thin-bedded, carbonaceous and siliceous sedimentary rocks and metasedi-

mentary rocks including graywacke, siltstone, slate, phyllite, phyllitic schist, schist, metasiltite, calcareous and micaceous schist, and minor dark-gray, fine grained marble; characteristically thin-bedded, carbonaceous, and siliceous. The unit is informally known as "York Slate" but the metamorphic grade is variable. In the York Mountains graywacke and siltstone are present but elsewhere these rocks are mostly of greenschist facies and commonly exhibit multiple foliations. Quartz, albite, white mica, chlorite, and carbonate are the principal mineralogic components. Small metamorphosed mafic intrusives (g) are present locally Amphibolite facies schist, derived in part from this unit, is present in the Kigluaik, Bendeleben, and Darby Mountains (pKmu). In the York Mountains, rocks of this unit are depositionally transitional below unfossiliferous limestones of inferred late Precambrian age (p61). (Sainsbury, 1969,

METAVOLCANIC ROCKS (Upper Precambrian) Greenschist and associated meta-

sedimentary rocks including lenses of schistose marble. These rocks commonly contain chlorite, epidote, albite, quartz, calcite, amphibole, and sphene; glaucophane and garnet are present locally. Numerous small intrusive bodies of altered mafic rocks (g) are present in some area. (Sainsbury, Coleman, and Kachadoorian, 1970) GRANITIC GNEISS (Pre-Cretaceous) Generally seriate, fine-to mediumgrained, mica-plagioclase-K-feldspar-quartz orthogneiss; originally grandodiorite or granite. Known at three widely separated localities; the Kiwalik Mountain area, east of Serpentine River, and at Cape Nome. The granitic gneiss at Kiwalik Mountain is apparently surrounded by

low-grade metasedimentary rocks (p€s) but east of Serpentine River and at Cape Nome granitic gneiss is associated with other gneissic rocks (p $\epsilon$ gn). (Hudson, 1977)

METAMORPHIC ROCKS UNDIVIDED (Pre-Cretaceous) Schist and marble of the Kigluaik, Bendeleben, and Darby Mountains. Dominantly amphibolite-facies, biotite-rich metasedimentary rocks, locally with abundant garnet. In part represents high-grade equivalents of metasedimentary rocks in the pcs

GNEISS (Upper Precambrian) Biotite-feldspar-quartz gneiss (locally silliman-ite-bearing), coarsely crystalline marble, and calc-silicate rock. Pre-dominantely exposed in the central parts of the Kigluaik Mountains where both biotite-plagioclase-quartz gneiss and biotite-plagioclase-K-feldsparquartz gneiss are present. Some apparently similar rocks occur in the

> MAP SYMBOLS Major fold axis showing direction of plunge

REFERENCES Beikman, H. M., and Lathram, E. H., 1976, Preliminary geologic map of northern Alaska: U.S. Geol. Survey Map MF-189. Hopkins, D. M., 1963, Geology of the Imuruk Lake area, Seward Peninsula, Alaska: U.S. Geol. Survey Bull. 1141C, 101 p. Hopkins, D. M., Matthews, J. V., Wolfe, J. A., and Silberman, M. L., 1971, A Pliocene flora and insect fauna from the Bering Strait region; Paleogeography, Paleoclimatol., Paleoecol., v. 9, p. 211-231.

Fault, sawteeth on upper plate, dashed where concealed or inferred

Hudson, Travis, 1977, Genesis of a zoned granite stock, Seward Peninsula, Alaska: U.S. Geol. Survey open-file report 77-35. Knopf, Adolpf, 1908, Geology of the Seward Peninsula tin deposits, Alaska: U.S. Geol. Survey Bull. 358, 71 p. Miller, T. P., 1972, Potassium-rich alkaline intrusive rocks of western Alaska: Geol. Soc. America Bull., v. 83, p. 2111-2128. Miller, T. P., Patton, W. W., Jr., and Lanphere, M. A., 1966, Preliminary report on a plutonic belt in west-central Alaska, in Geological Survey Research 1966: U.S. Geol. Survey Prof. Paper 550-D, p.

Miller, T. P., Grybeck, D. G., Elliott, R. L., and Hudson, Travis, 1972, Preliminary geologic map of the eastern Solomon and southeastern Bendeleben quadrangles, eastern Seward Peninsula, Alaska: U.S. Geol. Miller, T. P., and Bunker, C. M., 1976, A reconnaissance study of the uranium and thorium contents of plutonic rocks of southeastern Seward Peninsula, Alaska: U.S. Geol. Survey Jour. Research, v. 4, no. 3,

Patton, W. W., Jr., 1967, Regional geologic map of the Candle quadrangle, Alaska: U.S. Geol. Survey Map I-492. Patton, W. W., Jr., 1973, Reconnaissance geology of the northern Yukon-Koyukuk province, Alaska: U.S. Geol. Survey Prof. Paper 774-A, 17 p. Patton, W. W., Jr., and Miller, T. P., 1968, Regional geologic map of the Selawik and southeastern Baird Mountains quadrangles, Alaska: U.S. Geol. Survey Map I-530. Sainsbury, C. L., 1964, Geology of the Lost River mine area, Alaska: U.S. Geol. Survey Bull. 1129, 80 p.

Sainsbury, C. L., 1969, Geology and ore deposits of the central York Mountains, Seward Peninsula, Alaska: U.S. Geol, Survey Bull, 1287, Sainsbury, C. L., 1972, Geologic map of the Teller quadrangle, western Seward Peninsula, Alaska: U.S. Geol. Survey Map I-685.

Sainsbury, C. L., 1974, Geologic map of the Bendeleben quadrangle, Seward Peninsula, Alaska: The Mapmakers, Anchorage. Sainsbury, C. L., 1975, Geology, ore deposits, and mineral potential of the Seward Peninsula, Alaska: U.S. Bur. Mines open-file report. Sainsbury, C. L., Coleman, R. G., and Kachadoorian, Reuben, 1970, Blueschist and related greenschist facies rocks of the Seward Peninsula, Alaska; U.S. Geol. Survey Prof. Paper 700-B, p. B33-B42. Sainsbury, C. L., Hudson, Travis, Kachadoorian, Reuben, and Richards, Thomas, 1970, Geology, mineral deposits, and geochemical and radiometric anomalies, Serpentine Hot Springs area, Seward Peninsula, Alaska: U.S.

Geol. Survey Bull. 1312-H, 19 p. Sainsbury, C. L., Hudson, Travis, Ewing, Rodney, and Marsh, W. R., 1972, Reconnaissance geologic map of the west half of the Solomon quadrangle, Alaska: U.S. Geol. Survey open-file report. Sainsbury, C. L., Hummel, C. L., and Hudson, Travis, 1972, Reconnaissance geologic map of the Nome quadrangle, Seward Peninsula, Alaska: U.S. Geol. Survey open-file report. Sigafoos, R. S., 1958, Vegetation of northwestern North America, as an aid

in interpretation of geologic data: U.S. Geol, Survey Bull, 1061-E, Steidtman, Edward, and Cathcart, S. H., 1922, Geology of the York tin deposits, Alaska: U.S. Geol. Survey Bull, 733, 130 p.

> This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey standards

Supersedes Open File Report 77-167A

and nomenclature.

THE STATE OF THE S 一世数位数的位置。 李春节。 图1769

EXPLANATORY NOTE This map is one of several data components prepared as a foundation for evaluating the mineral resource potential of Seward Peninsula. In addition to the sources of geologic data credited in the index map, Sainsbury's (1975) summary of his extensive geologic studies on Seward Peninsula has been particularly helpful. The map, unit descriptions, and correlations reflect as closely as possible the geology as published in the principal sources of geologic data. Important sources of additional and more detailed descriptive data are referenced in the description of map units. CORRELATION OF MAP UNITS TERTIARY OR J CRETACEOUS Kgg Ks CRETACEOUS Kai } Lower Cretaceous JURASSIC (?) TO PERMIAN (?) MISSISSIPPIAN pKmu pKg }Pre-Cretaceous PALEOZOIC SILURIAN AND ORDOVICIAN pEL p€s p€v PRECAMBRIAN DESCRIPTION OF MAP UNITS TUNDRA (Holocene) Dense vegetation mat consisting of herbaceous and shrubby plants. Shown only in areas where it forms an extensive and essentially con-Qt YOUNGER BEACH DEPOSITS (Holocene) Sand and gravel deposits related to present Qb SURFICIAL DEPOSITS UNDIVIDED (Holocene and Pleistocene) Silt, sand, gravel, and glacial drift. Commonly covered by tundra (Qt) OLDER BEACH DEPOSITS (Pleistocene) Sand and gravel deposits shown only in Port Clarence and Cape Rodney areas. Commonly covered by tundra (Qt) and Qbo other surficial deposits (Qs) BASALT (Quaternary and Upper Tertiary) Dominantly vesicular dlivine basalt but includes breccia, agglomerate, scoria, tuff, and cinder deposits. Present locally throughout the Seward Peninsula but forms extensive subaerial QTb accumulations to a few hundred meters thick in the Imuruk Lake area, in major drainages of the northeastern map area, and southwest of Cape Espenburg. K/Ar ages as old as 5.7 m.y. (Hopkins and others, 1971). (Hopkins, 1963) SEDIMENTARY ROCKS (Tertiary and Upper Cretaceous) Predominantly nonmarine clastic rocks including conglomerate, sandstone, siltstone, shale, clay-stone, and coal. Impure calcareous rocks are present locally along the Kugruk River. Definite Tertiary rock known only from the basin in the upper reaches of the Kuzitrin River. Similar basins probably include Imuruk Basin, McCarthy's Marsh, and Death Valley. Rocks of Late Cretaceous age, and possibly in part of Tertiary age, are found in the Kugruk River valley and in a north-trending belt east of the Darby Mountains. Coalbearing strata are present in a small exposure in the Sinuk River area of southwestern Seward Peninsula BIOTITE GRANITE (Upper Cretaceous) Equigranular to porphyritic and generally non-foliate. Forms several epizonal, composite plutons in a 175 km belt from Cape Prince of Wales northeast to headwaters of Serpentine River. Reported K/Ar ages range from 69 to 78 m.v. (Sainsbury, 1969, 1975, Hudson) 1977). (Knopf, 1908. Steidtman and Cathcart, 1922, Sainsbury, 1964, 1969, Sainsbury, Hudson, Kachadoorian, and Richards, 1970, Hudson, 1977) BIOTITE GRANITE AND GRANODIORITE (Cretaceous) Fine-to coarse-grained, equigranular to porphyritic, and massive to foliate; hornblende and garnet occur locally as accessory minerals. Forms main plutons of Bendeleben and Darby Mountains, a large pluton mostly covered by young volcanic rocks (QTb) north of the Bendeleben Mountains, and many smaller plutons (mostly unmapped) in the Western Bendeleben and in the Kigluaik Mountains. K/Ar ages of the Darby pluton range from 88-94 m.y. and the Bendeleben pluton has a K/Ar age of 80 m.y. (Miller and Bunker, 1976). Some undated bodies could be younger SEDIMENTARY ROCKS (Cretaceous) Dominantly marine clastic rocks including graywacke, calcareous graywacke, conglomerate, and mudstone. Derived mostly from older Mesozoic volcanic and plutonic rocks that border Seward Peninsula along its eastern margin. (Patton, 1973) ALKALIC AND ASSOCIATED INTRUSIVE ROCKS (Cretaceous) Quartz monzonite, monzonite, syenite, and nepheline syenite. Fine-to coarse-grained, equigranular to Kai porphyritic, generally non-foliate, locally trachytoid; fluorite is a common accessory mineral. Many associated subsilicic and potassium-rich dikes. Forms several epizonal and composite plutons in a 200 km northeasterly trending belt from Golovin Bay to northeast of the Buckland River. Reported K/Ar ages range from 93 to 108 m.y. (Miller and others, 1966, Miller, 1972, Miller and Bunker, ANDESITIC VOLCANIC ROCKS (Lower Cretaceous) Flows, tuff, breccia, agglomerate, and volcanogenic sedimentary rocks. Principally exposed east of Kiwalik River where they are intruded by mid-Cretaceous plutons (Kai). (Patton, 1973) MAFIC METAVOLCANIC ROCKS (Jurassic (?) to Permian (?)) Metabasalt with minor sheared serpentinite in a thin northerly trending belt near the southeast boundary of the peninsula. Age unknown but lithologically correlated with rocks of a Permian to Jurassic (?) ophiolitelike assemblage present along parts of the Yukon-Koyukuk province margin. (Patton, 1973) LIMESTONE (Mississippian) Dark limestone, marble, and subordinate shale near Tin City and north of the Imachuck River. Area north of the Imachuck River probably includes rocks of several other units MARBLE (Paleozoic) Chiefly light-to dark-gray calcareous and dolomitic marble but with lesser limestone, dolomitic limestone, dolomite, and clastic sedimentary rocks. Widely distributed and sparsely fossiliferous; fossils commonly suggestive or definitive of a Devonian age but in part probably includes older

> LIMESTONE (Silurian and Ordovician) Fossiliferous limestone, argillaceous limestone, and shale; locally with chert lenses and nodules. Forms a complexly faulted and in large part allocthonous terrane in the western map area.

Stratigraphic thickness probably exceeds 3000 m. Locally includes Devonian and possibly Cambrian and late Precambrian rocks. (Sainsbury, 1969)

Rocky Point

Pt Dexter

Besboro Island R

Shaktoolik ?

SOUND

LOCATION OF SEWARD PENINSULA, ALASKA

GEOLOGIC MAP OF SEWARD PENINSULA, ALASKA

100 KILOMETERS Compiled by

1977

Cape Darby NORTON SOUND Base from National Atlas 1:2,000,000 series: NORTHERN ALASKA, SHEET #40, 1970. Patton, 1967 Sainsbury, 1974

and others 🛏

INDEX MAP SHOWING PRINCIPAL SOURCES OF GEOLOGIC DATA

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DEPARTMENT OF THE INTERIOR UNITED STATES GEOLOGICAL SURVEY

ARCTIC CIRCLE

Ukivok King Island

BERING

Travis Hudson